

REMARKS

Please reconsider the application in view of the following remarks. As a preliminary matter, the Applicant thanks the Examiner for the extremely thorough review of both the prior art and the present invention.

I. Disposition of Claims

Claims 1-53 are pending in this application. Claims 1, 24, 28, 40, and 45 are independent. The remaining claims depend, directly or indirectly, from claims 1, 24, 28, 40, and 45.

II. Rejections under 35 U.S.C § 102

Claims 1-53 were rejected under 35 U.S.C. § 102(a) as being anticipated by U.S. Patent No. 6,002,985 ("Stephenson"). This rejection is respectfully traversed.

The collection, management, and distribution of data used in the production, gathering, processing, and delivery of hydrocarbon products is important to the success of a gathering company. Data related to operations from production to delivery must be collected and delivered to both field and management personnel so that informed decisions may be made in the continuation of the hydrocarbon gathering processes (e.g., the gathering of liquid petroleum products and/or natural gas and its derivatives).

The present invention relates to a mechanism for coordinating physical testing and metering, well testing, system balancing, natural gas sampling analysis, monthly facilities reporting, and daily production reporting of data collected by a computer based system. While the invention is generally applicable to all forms of hydrocarbon

production, the following discussion focuses on natural gas production for the sake of clarity. A brief discussion of the concerns that the present invention is focused on dealing with is provided for the convenience of the Examiner.

Throughout natural gas gathering operations, it is important to have accurate metering of the gas volume and pressure and to have an accurate analysis of gas components. Electronic flow meters (EFM) located at various positions along the pipelines and at production wells provide most of the volume and pressure data. These meters need to be calibrated frequently to make sure that they accurately measure pressure and flow volume. The testing process is laborious because field technicians must physically go to the meters, which are typically widely dispersed geographically, to perform the testing.

In addition, gas purchase contracts generally provide the producer with the option to have a witness attend the meter testing so that test results may be verified. In some situations, contractual terms may dictate that these tests be performed based on the volume of hydrocarbon delivered over a selected period of time. Therefore, it can be difficult to predict the time when the EFM testing must be performed.

Proper gas sample analysis is also important for accurate measurement during gathering, processing, and sale of natural gas products. As mentioned previously, natural gas produced from different reservoirs typically has different chemical compositions. While EFMs measure pressure and volume of natural gas flow, it is necessary to measure natural gas composition so that the energy content of the gathered natural gas may be determined. "Energy content" typically refers to the amount of heat energy that is produced during combustion of the natural gas. Some natural gas compositions, for

example those containing at least a fractional percentage of heavier hydrocarbons (such as ethane), produce more energy when burned as fuel as compared to combustion of pure methane. Energy content is important to gathering companies because natural gas sales are typically based upon energy in BTU/scf (British Thermal Units per standard cubic foot). Knowledge of natural gas composition enables gathering companies to accurately convert flow volume to BTU content.

Contractual terms for the purchase of pipeline quality gas often set limits as to the energy content and component content. Therefore, the gathering company typically must send technicians to the field to take samples and then analyze the samples in the laboratories to determine the composition of the natural gas produced from each well.

The overall production and delivery of natural gas must be balanced. That is, the amounts of natural gas must be balanced with the amounts of gas delivered to customers and storage facilities. The balance procedure is traditionally performed periodically (e.g., monthly) when all of the volume, pressure, energy, and composition data are collected. If there is any imbalance, it is often difficult to determine the exact source because the absence of a centralized near real time database and the inherent latency in the collection of all required data.

Traditionally, problems in each segment of natural gas gathering and distribution (e.g., physical testing and metering, system balancing, and natural gas composition analysis) have been addressed independently. The independent approach results in fragmented operations where operating data and information is not efficiently shared between segments. Furthermore, multiple entries of continuously changing data can create accounting errors and inconsistencies between segments.

As mentioned above, in various embodiments, the present invention is concerned with providing an automated system to deal with the various aspects of hydrocarbon production discussed above. Therefore, certain embodiments of the present invention provide a system that automatically integrates and improves performance for the entire production, gathering, processing, and final sale of natural gas. The various aspects of the invention are individually discussed with reference to the claims below.

Claim 1

Claim 1 recites a method for the automated management of hydrocarbon gathering, that includes collecting data from a plurality of *automated measurement and control devices* positioned in a hydrocarbon gathering system, comparing the collected data with data stored in a database, and *using the data comparison to automatically schedule a test* of at least one of the plurality of automated measurement and control devices.

Thus, claim 1 requires that automated measurement and control devices be provided in the hydrocarbon gathering system, that the data be sent to a database and compared against other data, and that the data comparison be used to automatically schedule a test of at least one of the devices. These features are simply not shown in the prior art.

In contrast to the above, Stephenson relates to a neural network and genetic algorithm program to simulate the development of an oil and gas reservoir and generate *predictions* and *estimates* based on the simulation. After inputting desired parameters, Stephenson discloses that the neural network generates an output 36. Stephenson further states that

The output **36** simulates a production from such a proposed well. A representation of the simulated production output **36** is displayed for observation by an individual, such as through a monitor of the computer **26**. This display can be alphanumerical or graphical as representing a flow from a depicted well. Through operation of the display device in response to the output **36**, an **individual viewing the display** tracks possible production from a well to which a group from the hypothetical set of [input] parameters **34** is applied prior to any actual corresponding production occurring. (emphasis added) Col. 8, line 63-Col. 9, line 4.

Thus, in contrast to claim 1, which recites automatically generating a test, based on a comparison between actual field data and stored data, Stephenson merely discloses simulating the production of a well, so that an individual viewing the results can determine where to drill a new well, or how to improve performance of an existing well. Significantly, Stephenson is absolutely silent as to automating *any* part of the production cycle and, therefore, cannot anticipate claim 1 of the present invention.

The lines cited by the Examiner (col. 10, lines 1-13) do not relate to automatically scheduling a test, but rather merely illustrate that the neural network is able to continually be refined through the input of additional test data. This is not equivalent to the present invention in which tests are automatically scheduled based on deviations from expected results. Thus, withdrawal of the rejection of claim 1 is respectfully requested.

Claims 2-23 and claims 51-53, which depend, either directly or indirectly, from claim 1 are patentable for at least the same reasons. Withdrawal of the rejection of these claims is likewise requested.

Further, with respect to claim 3, which recites that the stored data comprises **contractual provisions**, the Examiner has cited col. 5, lines 56-60 as support for the assertion that Stephenson discloses this feature. The cited passage, however, does not relate to **contracts**, but rather merely discloses service company test results. Contracts impose duties on a party, such as requiring a set number of tests within a given time

period. The data taken itself does not constitute a contract. Further, with respect to claim 5, the Examiner relies on the discussion of “production parameters” found on col. 6, lines 8-15. Again, this discussion does not relate to contractual provisions, but rather is directed to inputting *historical production data*. This is further evidenced by the fact that the passage goes on to state that the parameters can be obtained from “a company such as Dwight’s that maintains data bases on oil and gas production.” The individual contracts referred to in claims 3 and 5 are not maintained in public databases, so these are not equivalent to, nor would one of ordinary skill believe them to be interchangeable with, publically accessible production data. Thus, the rejections of claim 3 and 5, independent from the rejection of claim 1, are untenable and must be withdrawn.

Claim 24

Claim 24 recites a method for the automated management of hydrocarbon gathering, that includes collecting well test data from at least one of a plurality of producing wells in a hydrocarbon gathering system, and using the well test data *to automatically reallocate hydrocarbon production* to at least one of the plurality of producing wells.

Thus, claim 24 provides for the *automatic* reallocation of hydrocarbon production based on well test data. Again, Stephenson is silent with respect to the automatic control of well production. Moreover, the Examiner has failed to even show where this automatic reallocation is allegedly disclosed in the prior art. The automatic reallocation of hydrocarbon production is simply not shown or suggested by the prior art. Withdrawal of this rejection is respectfully requested.

Claims 25-27, which depend, either directly or indirectly, from claim 24, are patentable for at least the same reasons.

Claim 28

Claim 28 recites a method for the automated management of hydrocarbon gathering, that includes calculating a system balance for a selected balance envelope, collecting hydrocarbon sample test data from at least one of a plurality of automated measurement and control devices positioned in a hydrocarbon gathering system, and using the hydrocarbon sample test data to automatically recalculate the system balance.

The passage cited by the Examiner (col. 10, line 1-13) does not disclose the automatic recalculation of the system balance, using hydrocarbon sample test data. The cited passage merely discloses that a correlation between the predicted production and actual production can be refined, based on additional data input into the system. Stephenson, therefore, does not disclose all of the limitations recited in claim 28. Thus, withdrawal of the rejection of claim 28 is respectfully requested.

Claims 29-39, which depend from claim 28, are patentable for at least the same reasons.

Moreover, claim 29, which recites the limitation of using the recalculated system balance to mix hydrocarbon products from at least two gathering pipelines to produce a desired hydrocarbon flow composition, is not shown or suggested by Stephenson. As discussed above, the neural network of Stephenson is a predictive tool and not a method for controlling production, as claimed in the present claims. The passage cited by the Examiner does not appear to have any relevance to this claim. Therefore, the rejection of claim 29 is untenable and should be withdrawn.

Claim 40

Claim 40 recites a method for the automated management of hydrocarbon gathering, that includes calculating a system balance for a selected balance envelope, testing at least one of a plurality of automated measurement and control devices positioned in a hydrocarbon gathering system, and using the test data to automatically recalculate the system balance.

The passage cited by the Examiner (col. 10, line 1-13) does not disclose the automatic recalculation of the system balance, using hydrocarbon sample test data. The cited passage merely discloses that a correlation between the predicted production and actual production can be refined, based on additional data input into the system. Stephenson, therefore, does not disclose all of the limitations recited in claim 40. Thus, withdrawal of the rejection of claim 40 is respectfully requested.

Claims 41-44, which depend from claim 40, are patentable for at least the same reasons.

Claim 45

Claim 45 recites a method for the automated management of hydrocarbon gathering, that includes calculating a composition of hydrocarbon flow in a hydrocarbon gathering system, collecting hydrocarbon sample test data from a plurality of automated measurement and control devices positioned in the hydrocarbon gathering system, and using the hydrocarbon sample test data to automatically recalculate the composition of hydrocarbon flow in the hydrocarbon gathering system.

Stephenson fails to disclose the limitation of using hydrocarbon sample test data to automatically recalculate the *composition* of hydrocarbon flow in a hydrocarbon

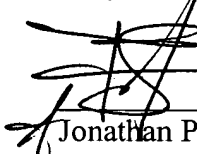
gathering system. Further, the Examiner has cited to no portion of the Stephenson for support of the assertion that claim 45 is anticipated. Therefore, withdrawal of the rejection is respectfully requested. Claims 46-50, which depend from claim 45, are likewise patentable.

III. Conclusion

Applicant believes this reply to be fully responsive to all outstanding issues and place this application in condition for allowance. If this belief is incorrect, or other issues arise, do not hesitate to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 06558.005001).

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Respectfully submitted,

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